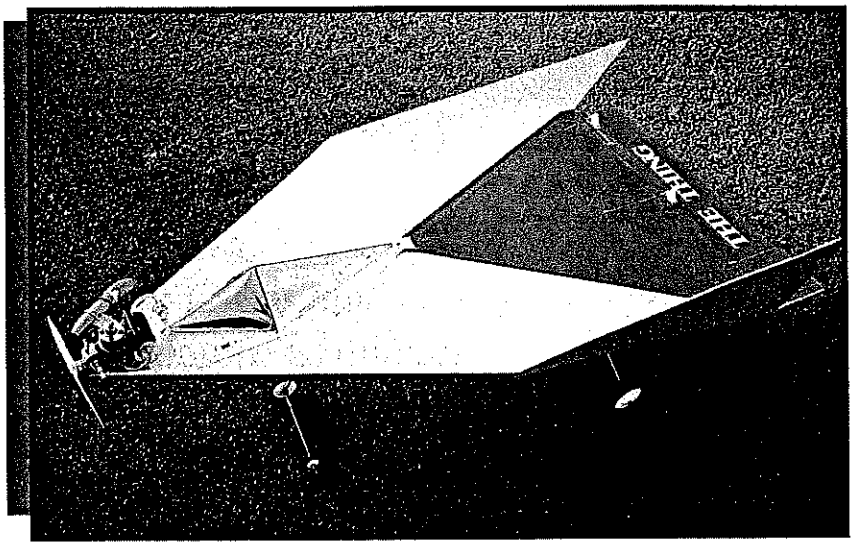
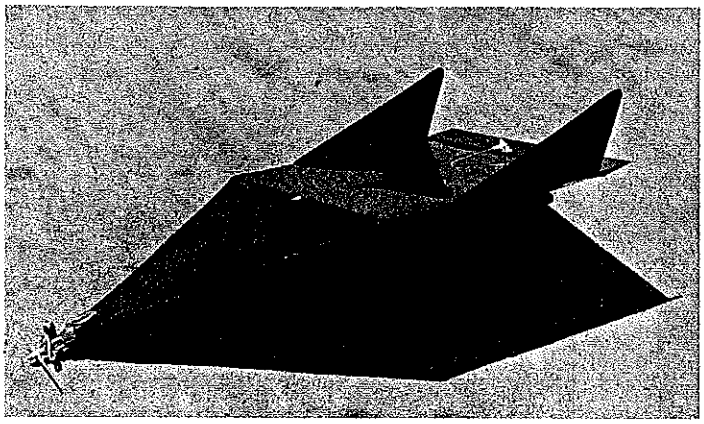
#773

THING III



■ **Barnaby Wainfan**



Above: The .020-powered Thing lifting body at rest. Right: The author launches the prototype at the Whittier Narrows model field near Los Angeles.

I have made a concerted effort to eliminate unnecessary parts of flying objects. My earlier free flight designs successfully eliminated the horizontal tail and then the vertical tail.

The Thing takes this process one step beyond the limits of good judgment and eliminates the wings, too. The lift-to-drag ratio was virtually eliminated along with the wings, but in the immortal last words of Otto Lilienthal, "sacrifices must be made."

The Thing is not efficient, but it is incredibly quick and simple to build, and it is a lot of fun to fly.

(Unfortunately, the vertical tail has reappeared. I tried to make it go away, but I needed someplace to hang a rudder.)

The first version of the Thing was not my design. It was a Bill Potter design that appeared in the "For The Tenderfoot" section of the December 1972 *American Aircraft Modeler.*

The original Thing was a finless, wingless, lifting body about five inches long, made of solid sheet balsa. I was cheap, so I built mine out of cardboard. It did fly (albeit inefficiently) and was sufficiently rugged that I had a hard time destroying it. After building my original Thing I moved on to other models and it was forgotten.

The concept re-emerged from a discussion with some coworkers about the neat flying objects we had all built as kids. One of them recalled the Thing. I tried to recreate it from memory, and we soon had a file-folder cardboard version flying between cubicles in the engineering offices of a major aerospace corporation. I will not name the company; some of my friends still work there!

The office-Thing got me thinking about the concept again, and I built a stick-and-tissue free flight Thing, powered by an ancient reed-valve .020. The free flight Thing was (and still is) a great small-field sport model. Since it comes down almost as fast as it goes up, you can use a long motor run and get the model quite high and still not lose it. (The RC Thing presented in this article could easily be converted to free flight by simply deleting the radio and gluing the control surfaces in the right positions.)

It was inevitable that the next stage in my Thing obsession would be a radio-controlled version. It is a simple enough model that it was impossible to resist the temptation to build one just to see what it would do. After all, it's hard to find a quicker-to-build model than one with no wings and no curved parts at all.The entire model is an assembly of straight sticks and sheets and has a "Thingspan" of only 15½ inches. It is powered by a Cox TD .020 engine and weighs about 10 ounces, so it is cheap to fly and easy to transport.

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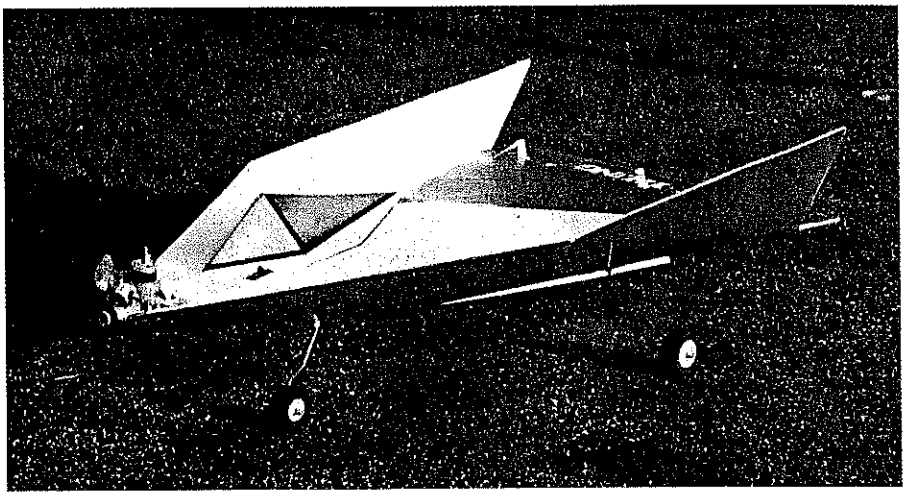


Don Larson's Super-Thing has a canopy, landing gear, and four-channel radio.

Only after I built and flew the RC Thing did I found my copy of the original Thing article. The current Thing is remarkably close to the original in body shape, although the original Thing did not have fins. I can't help but wonder if Bill Potter ever expected his minor bit of lunacy to be carried to such ridiculous extremes.

CONSTRUCTION

The first thing to keep in ming while building the model is *keep it light!* The Thing is not an efficient airframe and it depends on a low "Thing loading" to fly. A mini-radio and a 100 mAh battery pack are musts.

Resist the urge to beef up the model. Although the structure is light, it is strong enough to do its job. All of the weight is in the nose, and the rest of the structure is so light that there isn't enough inertia in it to cause breakage in the event of a mild crash or hard landing.

My original Thing has survived many landings. Early in its life, I planted it vertically while trying to get the controls worked out; it bounced.

The model is quick and easy to build once you figure out which direction all of the sticks go in. I recommend that you study the isometric assembly sequence drawing before going on to the full-size plans.

Building Sequence: I can't break this section into the classic fuselage, wings, tail, final assembly format, because many of the above-mentioned components are not used on this model at all. Building the "fuselage," "wing," "lifting body," or whatever you choose to call the main section of the vehicle requires that you follow this sequence:

1) Build the rectangle that forms the top of the aft portion of the model flat on the plan. The rest of the body will be built from this basic assembly.

2) Add the central bulkhead/former, which is made of 1/4 square sticks. This should be at right angles to the upper-aft-surface rectangle.

3) Add the two 1/4 square sticks and the 1/8 x 1 central piece that forms the bottom of the afterbody to complete the basic frame of the aft portion of the model. The sticks that form the frame halfway between the main bulkhead and the trailing edge can either be added at this point, or later when the model is removed from the plans.

4) Start construction of the forward pyramid by cutting the two top pieces of 1/4 square balsa. Prop up the ends of these sticks four inches where they join at the nose. Glue them together and to the ends of the stick forming the top of the main former.

5) Add the lower stick from the point of the nose to the point on the bottom of the main former to complete assembly of the basic shape.

Remove the model from the plan. Add the nose sheeting, forward frame sticks, and frame out the radio hatch in the top surface. The radio tray may need some modification to accommodate your system; the one shown in the pictures is for the Tower Hobbies Mini-Radio.

The engine nacelle is laminated of 1/4 balsa and the firewall is made of 1/16 plywood.

The keel should be added at this point. The top vertical fins and the elevator are made separately and added after covering the body.

Make a special effort to keep the fins and elevator light, since it is very easy to make the model tail-heavy. My prototype has an ounce an a half of lead in the nose to make it balance. I have since moved the radio forward to eliminate this ballast, and the model as drawn should balance properly.

Cover the model with Solarfilm, Black Baron or other low-temperature film. Use caution when shrinking the covering. The framework is quite light, and it is easy to warp the sticks and get that awful scallops-and-wrinkles look.

Hang the control surfaces and install your radio. The recommended control throws are 1/2 inch either way at the trailing edge of the elevator and rudder. I have not tried ailerons or elevons on a vehicle of this shape, and I have no idea what they would do. It might be an interesting experiment, but if you do add ailerons, do not eliminate the rudder. I have a feeling you will need it in slow flight and at high angles of attack.

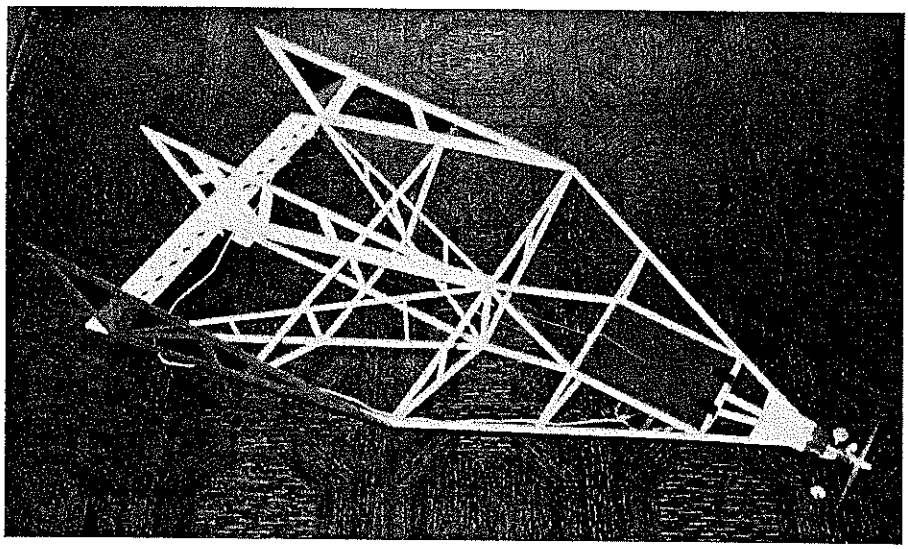
The model should be able to carry the weight of three miniservos if you keep the structure light. Since the prototype carried 1-1/2 ounces of ballast in the nose, you could easily substitute a third servo for the ballast if the radio was placed to get the CG in the right place. The CG should be about 1-1/2 inches ahead of the top crosspiece of the main former.

Flying: When the original Thing was complete, I had no choice but to attempt to make it fly. I would have preferred to do this in private, but an empty RC field is about as easy to find as the proverbial "tall grass" that free flighters are alleged to use for early test glides.

When I arrived at the flying site and placed the Thing on the flightline, I discovered the first of its virtues. Although I was sixth in line for my frequency, my transmitter mysteriously found its way to the head of the line. Everyone wanted to see the flight (crash) and were willing to let me fly before they did to speed up the entertainment I was expected to provide. They were not disappointed.

When it was first flown, the Thing did not have the upper vertical fins, and the rudder throw was about twice what it is now. I was afraid that the low-aspect-ratio rudder might not be effective enough to control it; I couldn't have been more wrong.

THING III



Thing framework is primarily composed of 1/4 square balsa sticks.

I launched the model and was pleasantly surprised that it did not execute an immediate Lomcevak. It was a bit out of trim (nose down) but this was quickly corrected and the Thing began to climb, acting as though it was actually stable.

When I attempted to suggest that it should change direction and maybe even consider turning, all hell broke loose. The model had a wicked combination of too much rudder throw, lots of effective dihedral, and almost no roll inertia or damping.

Every time I tried to turn it, it rolled a full 360° and headed off in another random direction. The only bright spot was that it appeared to be inherently stable as long as I left it alone and didn't try to tell it where to go.

Unfortunately, with no throttle, I did have to try to keep it in sight. My attempts to turn it and the resultant involuntary rolls caused the flight to terminate in a one-point landing. Much to my surprise, the model bounced and was virtually undamaged.

After making a hasty exit, I returned to the building board to fix the problem. I added the two top fins (a feature of my earlier free flight Thing) and cut down the rudder throw. I had to add some lead to the nose to compensate for the weight of the fins.

The modifications fixed the problem, and the Thing now flies strangely but well. Although it looks fast, it will actually fly quite slowly because of its "thing loading" and low aspect ratio. It will not do a true stall, and can be put into a nose-high, mushing flight attitude by slowly easing in full up elevator.

When the engine stops, the glide is slow but relatively steep. The glide ratio is about 4:1. My model needs a little down trim after the engine cuts to get the best glide. If you try to glide it too slowly, a gentle lateral oscillation (thing-rock) will set in, with the model rocking about 5°-10° side-to-side in each direction. This thing-rock is not divergent, and the model remains controllable, so it should be considered an indication that you are not at best glide speed rather than a warning of imminent disaster.

Thing III

Type: RC Sport

Wingspan: 15 1/2 inches

Engine size/type: .020 glow

Number of channels: 2-3

Flying weight: 10 ounces

Type of Construction: Built-up

Covering/finish: Low-temperature film

When you get used to it, you will find that the Thing can be landed at almost zero forward speed by easing in full up just before the model touches down. It will flare to a high angle of attack and plop down, much like a dethermalized free flight. This is particularly nice for keeping the bottom of the keel from being ground down by the runway.

The combination of light weight, large Thing-area and high-angle-of-attack capability makes the Thing capable of some interesting maneuvers. If you abruptly apply full up from level flight, the model will execute a loop that is so small it is closer to a tumble—the radius is about twice the length of the model.

The Thing will also do snap-turns, pivoting 180° in a few times its own length. To execute this maneuver, roll the model into the turn with rudder, then snap in full up for a moment. It will haul around in a turn with radius so small it boggles the mind.

Another strange maneuver is a flat-spinning descent. If you ease in full up elevator so that the Thing is in a mush, then add hard rudder as the elevator reaches the stop, the model will spin in its own length in a completely flat attitude.

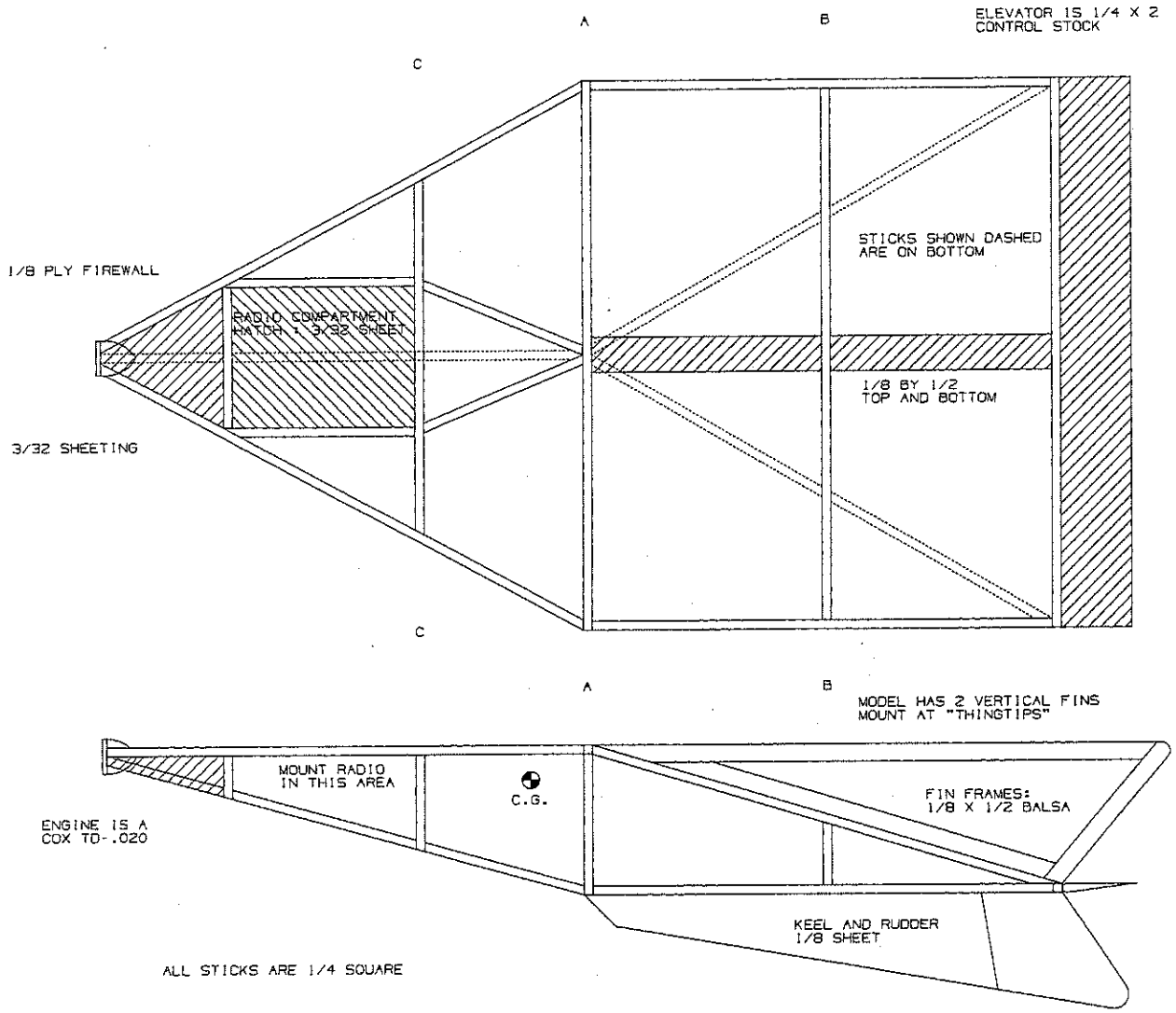
This maneuver is not a true spin, since the Thing is not really autorotating. It will recover as soon as the controls are released and will reverse its direction of rotation if the rudder is reversed while in the spin. My model will not quite maintain altitude in this mode, but I think that a lighter model or a slightly more powerful one would be capable of flat-spinning *up*.

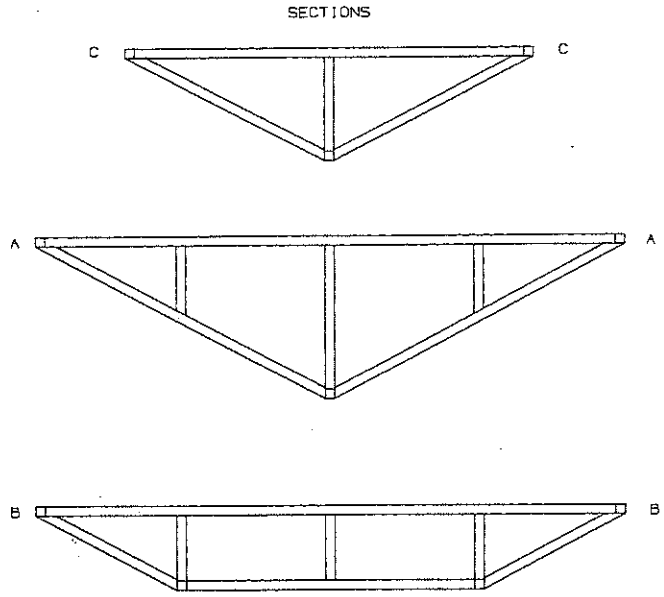
If you suddenly apply full down elevator while the Thing is in the flat spin, it will do a half-outside-tumble in its own length and fly away inverted. My prototype does not have an inverted fuel tank, so I quickly discovered that it will recover from inverted while gliding.

It is *very* easy to become disoriented when flying this model. Even experienced modelers may suddenly find that they have no idea which way it is going or what part of the model they are actually looking at. It is an unusual shape and it can change direction very quickly.

I have put a fluorescent orange stripe on the fin on one side of my model so I can at least tell which side I am looking at. I know that if I see orange it is moving left to right, and if I don't it is probably moving right to left.

The Thing is easy to build, fun to fly, and it is a great way to meet your fellow modelers, because everyone wants to ask, "does that Thing really fly?" If you have a spare evening or two, build one—you will like it. ✈





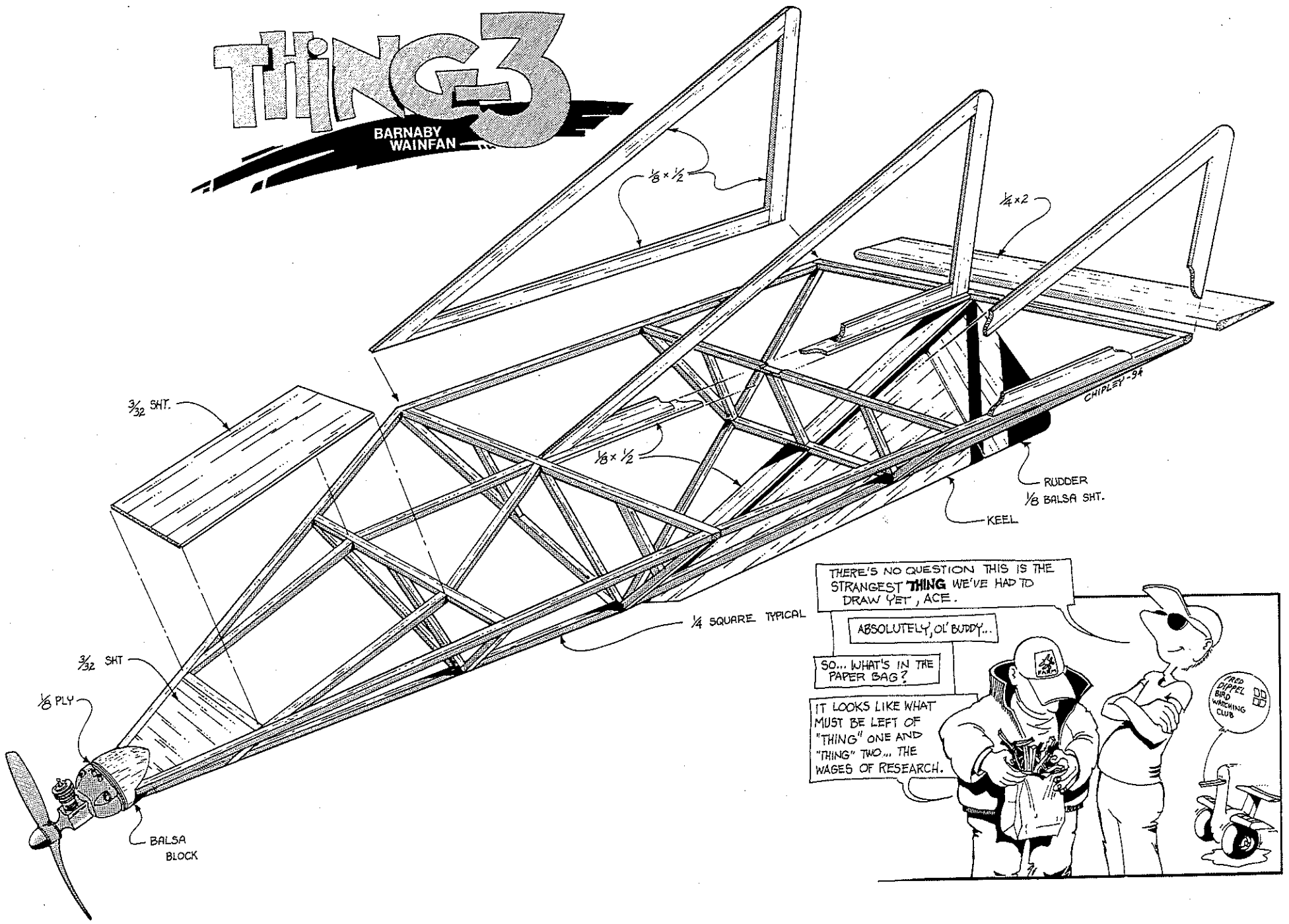
THING-3

R/C LIFTING BODY

BY BARNABY WAINFAN

774

Full-Size Plans Available—see page 184


THING 3
BARNABY WAINFAN
1/8 x 1/2
1/4 x 2
3/32 SHT.
1/8 x 1/2
CHIPLEY '94
RUDDER
1/8 BALSA SHT.
KEEL
1/4 SQUARE TYPICAL
3/32 SHT
1/8 PLY
BALSA BLOCK
THERE'S NO QUESTION THIS IS THE STRANGEST THING WE'VE HAD TO DRAW YET, ACE.
ABSOLUTELY, OL' BUDDY...
SO... WHAT'S IN THE PAPER BAG?
IT LOOKS LIKE WHAT MUST BE LEFT OF "THING" ONE AND "THING" TWO... THE WAGES OF RESEARCH.
FRED DIPPEL BIRD WATCHING CLUB